Amendments to the Specification:

Please replace the paragraphs starting at page 7, line 15 through line 23 of the application as originally filed providing the "BRIEF DESCRIPTION OF THE DRAWINGS" (Paragraphs 0031 - 0038 of the application as published) with the following paragraph:

~~FIG. 1: Prior Art showing conventional calculation of optical lever sensitivity.~~
~~FIG. 2: resulting from oscillation of the cantilever base (frequency=40 Hz).~~
~~FIG. 3: Power spectra of cantilever thermal fluctuations~~
~~FIG. 4: Hysteresis loops as oscillating cantilever base is separated from sample.~~
~~FIG. 5: Dependence of deflection, resonance and quality factor on separation from sample.~~
~~FIG. 6: Dependence of Kappa on separation from sample.~~
~~FIG. 7: Spring constant values with different methods.~~
~~FIG. 8: Fluid flow around cantilevers.~~
FIG. 1A depicts a simplified plane view of cantilever to be placed in contact with a hard surface for calculating optical lever sensitivity according to previous methods;
FIG. 1B shows a graphical representation of cantilever deflection in relation to a distance (Z) between the cantilever and the surface of FIG. 1A;
FIG. 2 depicts a graphical representation of a measured hysteresis of deflection resulting from oscillating a cantilever;
FIG. 3 depicts a graphical representation of a power spectrum for a plurality of cantilevers exposed to various environmental conditions during oscillation of the cantilever;

FIG. 4 depicts a graphical representation of a plurality of measured hysteresis loops as a cantilever base is moved relative to a surface;

FIG. 5A depicts a graphical representation of the amplitude of hysteretic damping as a function of cantilever tip separation from a surface for a plurality of cantilevers over a range of cantilever base excitation amplitudes and frequencies;

FIG. 5B depicts a graphical representation of a resonant frequency measured with thermal noise as a function of the tip sample separation for a series of cantilevers;

FIG. 5C depicts a graphical representation of a quality factor as a function of tip sample separation for a plurality of cantilevers;

FIG. 6 depicts a graphical representation of a phenomenological factor as a function of cantilever tip separation from a surface for a plurality of different amplitudes, frequencies and cantilevers;

FIG. 7 depicts a graphical representation of spring constants for a of a plurality of cantilevers utilizing a plurality of different methods for calculating the spring constants, including the method according to the present invention; and

FIG. 8 depicts a simplified block diagram of an apparatus for measuring a fluid flow rate.

Please replace the paragraph starting at page 8, line 3 of the application as filed (Paragraph 0039 of the application as published) with the following paragraph:

The optical sensitivity of the micromachined cantilever, the derivative of the change in cantilever deflection with respect to change in the z position of the cantilever tip (typically abbreviated as "OLS"), is the foundation for

correctly interpreting the results obtained from cantilever-based instruments. ~~Panel A of~~ FIG. 1A depicts [[the]] one of the conventional methods for determining OLS. As shown in the panel, the cantilever is pressed into a hard surface (typically freshly cleaved mica) by the instrument (not shown) and moved an arbitrary distance measured by the instrument. Deflection of the cantilever resulting from this change in position is measured with optical detection means commonly employed in such instruments: low coherence light is focused onto the back of the cantilever with an adjustable focus lens and the light reflecting off the cantilever is collected by an adjustable mirror and guided onto position sensor. The position sensor provides a voltage that is proportional to the deflection of the cantilever.

Please replace the paragraph starting at page 8, line 16 of the application as filed (Paragraph 0040 of the application as published) with the following paragraph:

~~Panel B of FIG. 1 graphs~~ FIG. 1B shows a graphical representation of the deflection of the cantilever vs. the z position of the tip. As shown in ~~Panel B~~ FIG. 1B, it is typical to calculate optical sensitivity as the inverse of OLS ("InvOLS"), the derivative of change in the z position of the cantilever tip with respect to change in cantilever deflection.

Please replace the paragraph starting at page 9, line 7 of the application as filed (Paragraph 0043 of the application as published) with the following paragraph:

As previously noted, it is not always desirable or convenient to determine InvOLS by making hard contact with a

well-defined rigid surface as shown in ~~Panel A of~~ FIG. 1A. The invention disclosed here permits determination of InvOLS without touching a surface by measuring cantilever deflection resulting from drag force as the cantilever is moved through a fluid (including air).

Please replace the paragraph starting at page 10, line 8 of the application as filed (Paragraph 0046 of the application as published) with the following paragraph:

FIG. 3 shows four power spectra of cantilevers in fluid. The two high frequency curves 350, 352 were made in air, [[one]] where a first measurement depicted by the first curve 350 was performed with the cantilever relatively far away from the surface, ~~the other~~ and the second measurement depicted by the second curve 352 was performed with the cantilever relatively close to the surface. The second spectrum 352 taken close to the surface had increased damping, yielding a peak with a lower quality factor. The [[two]] third and fourth curves 354, 356 with low peak frequencies were taken in fluid, which caused the resonance to be significantly damped. The fluid is also carried along with the lever as it moves, creating an effective mass that lowers the resonant frequency. The measured spring constants of the four levers (using the method of Hutter and Bechoefer, which requires hard contact with a surface) are virtually the same despite the different environments.

Please replace the paragraph starting at page 10, line 18 of the application as filed (Paragraph 0047 of the application as published) with the following paragraph:

From the data derived from the calculation of such power spectra, and using Equation 2, the damping coefficient, b_{therm}, may be calculated. In some embodiments, the power spectra is calculated through a computer means, such as a computer or processor.

Please replace the paragraph starting at page 11, line 17 of the application as filed (Paragraph 0050 of the application as published) with the following paragraph:

FIG. 4 shows a series of hysteresis loops measured at different cantilever tip-sample separations (ΔZ). [[As]] It is shown that measurements taken as the tip of the cantilever approaches the surface (towards the left of the Figure), the damping increases, until, in the last loop, intermittent contact with the surface is made. ~~Panel A of FIG. 5~~ FIG. 5A shows the amplitude of the hysteretic damping as a function of tip-sample separation for a range of cantilever base excitation amplitudes and frequencies. These data were extracted from a number of measurements similar to those shown in FIG. 4. ~~Panel B of FIG. 5~~ FIG. 5B shows the resonant frequency measured with thermal noise as a function of the tip sample separation for a series of similar triangle cantilevers. ~~Panel C of FIG. 5~~ FIG. 5C shows the quality factor Q measured in a similar fashion as a function of tip-sample separation. The x-axis in all three graphs extends out to 2 mm. It is apparent that the three quantities, cantilever deflection in volts ΔV (~~Panel A of Figure FIG. 5~~ FIG. 5A), quality factor Q (~~Panel B of FIG. 5~~ FIG. 5B) and resonant frequency ω_0 (~~Panel C of FIG. 5~~ FIG. 5C) have differing dependences on tip-sample separation. This implies that κ is a function of tip-sample separation. FIG. 6 shows κ as a function of tip-sample separation for eleven different amplitudes,

frequencies and cantilevers. These measurements imply that κ has a predictable behavior, at least for a particular lever in the amplitude and frequency range tested in this work. The curve in ~~this Figure~~ FIG. 6 can then be used in conjunction with Equation 3 to predict InvOLS and, via Equation 4, the spring constant of the lever.

Please replace the paragraph starting at page 12, line 18 of the application as filed (Paragraph 0052 of the application as published) with the following paragraph:

In ~~the present~~ one embodiment of the present invention, the fluid flow around the cantilever is induced by moving the base of the cantilever. It is also possible, and in some situations desirable, to induce fluid flow around the lever with some other method, such as an external pump or perfusion apparatus. FIG. 8 schematically illustrates such an arrangement, where the fluid flow 420 is controlled by an external apparatus to flow over the cantilever 422.